

**Listing of the Claims**

1. (Currently Amended) Device for the *in vivo* determination of the concentration of a PET tracer in blood, including
  - an image-producing device ~~(5, 6)~~ for the locally resolved depiction of a region of the body;
  - a TOF-PET unit ~~(3a, 3b)~~ for recording the concentration of the tracer in a predetermined volume element;
  - a data processing unit ~~(7)~~ which is coupled to the image-producing device ~~(5, 6)~~ and the TOF-PET unit ~~(3a, 3b)~~ and is arranged to set the TOF-PET unit ~~(3a, 3b)~~ in such a way that the volume element ~~(2)~~ that is recorded with this lies in a body volume that is filled with blood, wherein the spatial position ~~( $\pm$ )~~ of the body volume is determined with the aid of the image-producing device ~~(5, 6)~~.
2. (Currently Amended) Device as claimed in claim 1, ~~characterized in that~~ wherein the TOF-PET unit comprises two  $\gamma$  detector elements ~~(3a, 3b)~~ that lie opposite one another, and the corresponding evaluation electronics unit for recording the times of flight of annihilation quanta ~~( $\gamma_1, \gamma_2$ )~~.
3. (Currently Amended) Device as claimed in claim 2, ~~characterized in that~~ wherein the effective area of each detector element is approximately 10 mm<sup>2</sup> to approximately 400 mm<sup>2</sup>.
4. (Currently Amended) Device as claimed in claim 1, ~~characterized in that~~ wherein the image-producing device includes an MRI device, ~~and/or~~ an X-ray projection device ~~(5, 6)~~, ~~in particular or~~ an X-ray computer tomography device.
5. (Currently Amended) Device as claimed in claim 1, ~~characterized in that~~ wherein it includes a PET device ~~(4)~~ for preferably three-dimensional recording of the distribution of the PET tracer in a body region.

6. (Currently Amended) Device as claimed in claim 1, ~~characterized in that~~  
wherein the data processing unit (7) is set up to segment segments a body volume that is  
filled with blood into images (A) produced by the image-producing device (5, 6).

7. (Currently Amended) Device as claimed in claim 1, ~~characterized in that~~  
wherein it includes a display device (8) for depicting illustrations (A) that have been  
produced with the image-producing device (5, 6), as well as input means (9) for interactive  
selection of a body volume in these images (A).

8. (Currently Amended) Device as claimed in claim 1, ~~characterized in that~~  
wherein the body volume filled with blood lies in the aorta or in the left ventricle of the  
heart.

9. (Currently Amended) A method for the *in vivo* determination of the  
concentration of a PET tracer in the blood, comprising the steps of:

- production of at least one locally resolved image (A) of a body region;
- determination of the spatial position (~~x~~) of a body volume filled with blood  
on the basis of the image produced (A);
- recording of annihilation quanta ( $\gamma_1, \gamma_2$ ) coming out of the body volume,  
taking account of their times of flight.

10. (Currently Amended) A method as claimed in claim 9, ~~characterized in that~~  
wherein a dynamic, preferably three-dimensional PET recording of a further body region  
takes place, and that the data obtained here ~~are~~ is combined with the established  
concentration of the PET tracer in the blood.